Claims

1. A protecting apparatus for protecting a structure from an impact, said protecting apparatus being arranged to be mounted on the structure and including a bumper member, a structure positioning member and at least one resiliently flexible joining portion, said structure positioning member being arranged in use to be positioned in contact with or adjacent to a portion of the structure being protected, said at least one resiliently flexible joining portion extending between said bumper member and said structure positioning member so that when an outer surface of the bumper member is impacted the impact force is dissipated at least in part by flexure of said at least one joining portion.

2. A protecting apparatus according to claim 1 wherein the impact force is further dissipated by flexure of said bumper member and/or said structure positioning member.

3. A protecting apparatus according to claim 1 or claim 2 wherein said at least one resiliently flexible joining portion adopts a tortuous path between the bumper member and the structure positioning member.

4. A protecting apparatus according to claim 3 wherein the tortuous path is curved so as to minimise any points of stress concentration along said path.

5. A protecting apparatus according to any one of the preceding claims wherein a first end of said joining portion is connected to the bumper member and a second end is connected to the structure positioning member.

6. A protecting apparatus according to claim 5 wherein connection of said first and second ends of said joining portion to the respective bumper member and structure positioning member occurs at a zone of connection so as to minimise stress concentrations in the protecting apparatus.

7. A protecting apparatus according to claim 6 wherein stress concentrations are minimised by curving the zones of connection.

8. A protecting apparatus according to any one of the preceding wherein the bumper member has a first end and a second end, said first and second ends being arranged to be joined to the structure positioning member by respective first and second resiliently flexible joining members.

9. A protecting apparatus according to claim 8 wherein said first and second joining members, said bumper member and said structure positioning member are shaped so as to define an opening in which the portion of the structure can be received.

10. A protecting apparatus according to claim 9 wherein a tongue is located at or adjacent to each of the first and second ends of the bumper member, said tongue being arranged in use to contact the structure when it is located in the opening and to facilitate retention of the protecting apparatus about said structure.

11. A protecting apparatus according to claim 10 wherein a further tongue may is provided on each of the first and second joining members to further facilitate retention of the protecting apparatus about said structure.

12. A protecting apparatus according to any one of claims 10 or 11 wherein the tongues are resiliently flexible and arranged so that they are deflected in order to receive the portion of the structure within the opening and, once the portion of the structure is located in the opening, arranged to engage against the structure.

13. A protecting apparatus according to any one of the preceding claims further including a securing member arranged to retain the protecting apparatus about said structure.

14. A protecting apparatus according to any one of the preceding claims which is arranged to be retained tightly on the structure or to be retained in a manner which allows it to be slid along a length thereof.

15. A protecting apparatus according to any one of the preceding claims wherein the bumper member is configured so as to extend about a major portion of the structure so as to protect as much of the structure as possible.

16. A protecting apparatus according to any one of the preceding claims wherein the surface of the bumper member is smooth and continuous.

17. A protecting apparatus according to any one of the preceding claims wherein the bumper member, structure positioning member and said at least one joining portion are integrally formed.

18. A protecting apparatus according to claim 17 wherein the protecting apparatus in moulded as a single piece in a plastics material.

19. A protecting apparatus according to any one of the preceding claims arranged so that a plurality of such protecting apparatus can be stacked one on top of the other along a length of the structure.

AMENDED CLAIMS

[received by the International Bureau on 17 March 2005 (17.03.05);
original claims 1-19 replaced by new claims 1-20 (3 pages)]

1. A protecting apparatus for protecting a structure from an impact, said protecting apparatus including a bumper member arranged in use to receive an impact force, a structure positioning member arranged to be positioned in contact with or adjacent to a portion of the structure, a first joining member joining a first end of the structure positioning member to a first end of the bumper member and a second joining member joining a second end of the structure positioning member to a second end of the bumper member so that said structure positioning member and said first and second joining members define an opening for receiving at least said portion of the structure and at least one resiliently flexible joining portion extending between said bumper member and said structure positioning member arranged so that when an outer surface of the bumper member is impacted said impact force is dissipated at least in part by flexure of said at least one joining portion.

2. A protecting apparatus according to claim 1 wherein said impact force is further dissipated by flexure of said bumper member and/or flexure of said structure positioning member and/or fracture of said at least one joining portion.

3. A protecting apparatus according to claim 1 or claim 2 wherein said at least one resiliently flexible joining portion adopts a tortuous path between the bumper member and the structure positioning member.

4. A protecting apparatus according to claim 3 wherein the tortuous path is curved so as to minimise any points of stress concentration along said path.

5. A protecting apparatus according to any one of the preceding claims wherein said first and second joining members join to said bumper member and said structure positioning member at respective zones of connection so as to minimise stress concentrations in the protecting apparatus.

6. A protecting apparatus according to any one of the preceding claims wherein the first and second joining members each adopt a tortuous path between the respective ends of the positioning member and the bumper member.

7. A protecting apparatus according to claim 6 wherein the first and second joining members are resiliently flexible.

8. A protecting apparatus according to claim 7 wherein the first and second joining members and the bumper member are arranged to resiliently deflect to enable said portion of said structure to be received in said opening.

9. A protecting apparatus according to any one of the preceding claims wherein said at least one joining portion joins to the respective bumper member and structure positioning member at respective zones of connection so as to minimise stress concentrations in the protecting apparatus.

10. A protecting apparatus according to claim 9 wherein said stress concentrations are minimised by curving the zones of connection.

11. A protecting apparatus according to any one of the preceding claims wherein a tongue is located at or adjacent to each of the first and second ends of the bumper member, said tongues being arranged in use to contact the structure when it is received in said opening and to facilitate retention of the protecting apparatus about said structure.

12. A protecting apparatus according to claim 11 wherein a further tongue is provided on each of the first and second joining members to further facilitate retention of the protecting apparatus about said structure.

13. A protecting apparatus according to claim 11 or claim 12 wherein the tongues are resiliently flexible and arranged so that they are deflected in order to receive the portion of the structure within the opening and, once the portion of

the structure is located in the opening, arranged to engage against the structure.

14. A protecting apparatus according to any one of the preceding claims further including a securing member arranged to retain the protecting apparatus about said structure.

15. A protecting apparatus according to any one of the preceding claims arranged to be retained tightly on the structure or to be retained in a manner which allows it to be slid along a length thereof.

16. A protecting apparatus according to any one of the preceding claims wherein the bumper member is configured so as to extend about a major portion of the structure so as to protect as much of the structure as possible.

17. A protecting apparatus according to any one of the preceding claims wherein the outer surface of the bumper member is smooth and continuous.

18. A protecting apparatus according to any one of the preceding claims wherein the bumper member, structure positioning member, first and second joining members and said at least one joining portion are integrally formed.

19. A protecting apparatus according to claim 18 wherein the protecting apparatus in moulded as a single piece in a plastics material.

20. A protecting apparatus according to any one of the preceding claims arranged so that a plurality of such protecting apparatus can be stacked one on top of the other along a length of the structure.